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JC948 U.S. PTO
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JC853 U.S. PTO
09/699757
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LIMBACH & LIMBACH L.L.P.
2001 Ferry Building, San Francisco, CA 94111
415/433-4150

Address to:
Box Patent Application
Commissioner for Patents
Washington, D.C. 20231

Attorney's Docket No. SONY-U0366

First Named Inventor NOBUYUKI MATSUSHITA

UTILITY PATENT APPLICATION TRANSMITTAL
(under 37 CFR 1.53(b))

01362
PATENT TRADEMARK OFFICE

SIR:

Transmitted herewith for filing is the patent application entitled:
GRAPHIC PROCESSING APPARATUS

CERTIFICATION UNDER 37 CFR § 1.10

I hereby certify that this New Application and the documents referred to as enclosed herein are being deposited with the United States Postal Service on this date October 30, 2000, in an envelope bearing "Express Mail Post Office To Addressee" Mailing Label Number EL254113624US addressed to: Box Patent Application, Commissioner for Patents, Washington, D.C. 20231.

LANA T. BRENNER
(Name of person mailing paper)

(Signature)

Enclosed are:

1. X Transmittal Form (two copies required)

2. The papers required for filing date under CFR § 1.53(b):
   i. 21 Pages of specification (including claims and abstract);
   ii. 14 Sheets of drawings.
   __ formal x informal

3. Declaration or oath

   a. x Unsigned - Combined with Power of Attorney

ACCOMPANYING APPLICATION PARTS

4. __ An assignment of the invention to Sony Corporation is attached (including Form PTO-1595).

   i. __ 37 CFR 3.73(b) Statement (when there is an assignee)

5. x Power of Attorney - Unsigned - Combined with Declaration

6. __ An Information Disclosure Statement (IDS) is enclosed, including a PTO-1449 and copies of __ references.

7. X Preliminary Amendment.

8. X Return Receipt Postcard (MPEP 503 -- should be specifically itemized)

9. FOREIGN PRIORITY
   [X] Priority of application no. P11-313536 filed on November 4, 1999 in Japan is claimed under 35 USC 119.

   The certified copy of the priority application:
   x is filed herewith; or
   _ has been filed in prior application no. _ filed on _, or
   _ will be provided.

   __ English Translation Document (if applicable)

10. **FEE CALCULATION**

a. __ Amendment changing number of claims or deleting multiple dependencies is enclosed.

CLAIMS AS FILED

	Number Filed	Number Extra	Rate	Basic Fee ($710)
Total Claims	10 - 20	* 0	x $18.00	0
Independent Claims	5 - 3	* 2	x $80.00	160.00
x Multiple dependent claim(s), if any			$270.00	270.00

*If less than zero, enter "0".

Filing Fee Calculation $1,140.00

50% Filing Fee Reduction (if applicable) . . . . . $

11. Small Entity Status
   a. __ A small entity statement is enclosed.
   b. __ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.
   c. __ is no longer claimed.

12. Other Fees
   __ Recording Assignment [$40.00] $0
   __ Other fees
   Specify _____ $0

Total Fees Enclosed $1,140.00

13. Payment of Fees
   x Check(s) in the amount of $ 1,140.00 enclosed.
   __ Charge Account No. 12-1420 in the amount of $__.
   A duplicate of this transmittal is attached.

14. All correspondence regarding this application should be forwarded to the undersigned attorney:

Charles P. Sammut
Limbach & Limbach L.L.P.
2001 Ferry Building
San Francisco, CA 94111
Telephone: 415/433-4150
Facsimile: 415/433-8716

15. Authorization to Charge Additional Fees

X The Commissioner is hereby authorized to charge any additional fees (or credit any overpayment) associated with this communication and which may be required under 37 CFR § 1.16 or § 1.17 to Account No. 12-1420. **A duplicate of this transmittal is attached**.

LIMBACH & LIMBACH L.L.P.

October 30, 2000
(Date)

By: _____
Charles P. Sammut
Registration No. 28,901
Attorney(s) or Agent(s) for Applicant(s)

Attorney Docket No. SONY-U0366
[S00P1366US00]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	Group Art Unit: Unknown
NOBUYUKI MATSUSHITA ET AL.	Examiner: Unknown
Application No. Not Assigned	PRELIMINARY AMENDMENT
Filed: Herewith	2001 Ferry Bldg. San Francisco, CA 94111
For: GRAPHIC PROCESSING APPARATUS	Ph.: 415-433-4150

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, please enter the following amendments:

In the Specification

Page 5, line 2, please change "Fig. 5 shows" to --Figs. 5A, 5B, 5C, 5D, 5E and 5F show--;

Page 5, line 6, please change "Fig. 8 shows" to --Figs. 8A, 8B, 8C, 8D, 8E and 8F show--;

Page 5, line 11, please change "Fig. 11 explains" to --Figs. 11A, 11B, 11C, 11D, 11E and 11F explain--;

Page 5, line 15, please change "Fig. 14 is an additional explanation -- Figs. 14A, 14B and 14C are additional explanations--;

Page 9, line 7, please change "Fig. 5 shows" to --Figs. 5A, 5B, 5C, 5D, 5E and 5F show--;

Page 10, line 18, please change "Fig. 8 shows" to --Figs. 8A, 8B, 8C, 8D, 8E and 8F show--;

Page 14, line 4, please change "Fig. 14 explains" to Figs. 14A, 14B and 14C explain--.

REMARKS

The amendments to the specification and drawings are to conform the drawings to the specification, to conform the specification to the drawings and/or correct typographical errors. It is respectfully submitted that such amendments are supported by the specification, claims, abstract of the disclosure and the drawings.

The Examiner's early examination and consideration are respectfully requested.

Respectfully submitted,
LIMBACH & LIMBACH L.L.P.

By: _____
Charles P. Sammut
Reg. No. 28,901

October 30, 2000
Our File: SONY-U0366

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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LIMBACH & LIMBACH L.L.P.

By: _____
Charles P. Sammut
Reg. No. 28,901

October 30, 2000
Our File: SONY-U0366

Title of the Invention

Graphic Processing Apparatus

Background of the Invention

Field of the Invention

The present invention relates to a graphic processing apparatus and in particular to an apparatus capable of easily performing graphic processing even when a touch panel is used.

Description of the Prior Art

With increase of the computer performance and the technique to reduce the size, various portable computers (personal digital assist, PDA) are now widely used. Most of the conventional PDA employs an interface for performing almost all the operations with a single pen. This is based on the metaphor of a notebook and a pencil.

By the way, a graphic operation is widely performed using a graphic creation software through operation of a keyboard and a mouse. When such a graphic edition operation is to be performed on the aforementioned PDA touch panel using a pen or finger, only one point on the panel can be specified and it is necessary to repeatedly perform a complicated processing. For example, an operation type (such as move) is selected through a menu and a graphic object is moved with the pen. This should be

repeated for edition, requiring a complicated process.

Recently, as disclosed in Japanese Patent Publication 9-34626, a technique to simultaneously push and two points on the touch panel has been suggested. It is known that this technique is used in the touch panel, so that in the same way as the keyboard, an operation combining the Shift key and an alphabet key can be performed.

Summary of the Invention

It is therefore an object of the present invention to provide an apparatus capable of easily performing a graphic processing on the touch panel using the technique to simultaneously enter two points on the touch panel.

That is, the present invention provides a graphic processing apparatus including: a touch panel; means for deciding whether a single point or two points are specified on the touch panel; means for performing a graphic processing in a first graphic processing mode when the single point is specified; and means for performing a graphic processing in a second graphic processing mode when the two points are specified.

With this configuration, it is possible to select a graphic processing mode according to the number of points specified and accordingly, it is possible to select a predetermined graphic processing with a small number of operation steps. For example, when a single point is specified, a graphic object is moved and a segment is drawn on point basis and when two points are specified, it is possible to perform

edition such as enlargement, reduction, and rotation. In this case, the edition types may be identified by the moving state of the specified position. For example, when a first point is fixed and a second point is moved apart from the first point, enlargement or reduction is performed in this direction and rotation is performed around the fixed point.

Moreover, the present invention provides a portable computer including: a frame which can be grasped by a user's hand; a touch panel formed on the upper surface of the frame; detection means for detecting specification of a predetermined area on the touch panel in the vicinity of a region where a user's thumb is positioned when he/she grasps the portable computer; interpretation means for interpreting another point specification on the touch panel in a corresponding interpretation mode according to a detection output from the detection means while the predetermined area is specified; and execution means for executing a predetermined processing according to a result of the interpretation.

With this configuration, it is possible to specify a point on the touch panel with a pen or a finger and to specify a predetermined area on the touch panel using a thumb of the hand grasping the portable computer body. In the conventional example, one hand is used for grasping a portable terminal and the other hand is used to specify a position on the touch panel. In the present invention, the thumb which has not been used conventionally can be used to select a menu and an operation mode.

Furthermore, the present invention provides a coordinate position input

apparatus including: a touch panel for outputting a coordinate data of a middle point when two points are simultaneously touched; storage means for retaining coordinate position of the two points detected previously; detection means for detecting a coordinate position of a current middle point; and calculation means for calculating a coordinate of one of the two touch points assumed to be a moving point by subtracting a coordinate position of a previous fixed point from a current middle point coordinate multiplied by 2.

With this configuration, by employing a user interface to assume one of the two touch points fixed, it is possible to easily and correctly calculate a coordinate position even when one of the two touch points is moved.

It should be noted that at least a part of the present invention can be realized as a computer software, and can be implemented as a computer program package (recording medium).

Brief Description of the Drawings

Fig. 1 shows a portable computer according to an embodiment of the present invention.

Fig. 2 is a block diagram showing a functional configuration of the aforementioned embodiment.

Fig. 3 is a block diagram explaining an essential portion of a touch panel driver in the aforementioned embodiment.

Fig. 4 explains a mode modification block in the aforementioned embodiment.

Fig. 5 shows an operation state in the aforementioned embodiment.

Fig. 6 explains a control operation in the aforementioned embodiment.

fig. 7 explains a mode modification block in a modified example of the aforementioned embodiment.

Fig. 8 shows an operation state of the modified example of Fig. 7.

Fig. 9 is a flowchart explaining a control operation in the modified example of Fig. 7.

Fig. 10 explains a mode modification block in another modified example of the aforementioned embodiment.

Fig. 11 explains an operation state of the modified example of Fig. 10.

Fig. 12 is a flowchart explaining a control operation in the modified example of Fig. 10.

Fig. 13 is a flowchart explaining coordinate position calculation processing.

Fig. 14 is an additional explanation to the coordinate position calculation processing of Fig. 13.

Detailed Description of a Preferred Embodiment

Description will now be directed to a preferred embodiment of the present invention with reference to the attached drawings.

Fig. 1 is an external view of a portable computer according to the embodiment.

In this figure, the portable computer 1 has a flattened cubic configuration of a size that can be grasped by one hand of a grownup. The portable computer 1 has on its upper side a pressure-sensitive (resistance type) touch panel 2. The touch panel is an ordinary pressure-sensitive type. When pressed with a pen (not depicted) or finger, a change of an inter-terminal voltage is detected so as to enter coordinates. In this embodiment, by properly designing the size of the portable computer 1, the user can freely move his/her thumb while grasping the portable computer 1. As shown in the figure, buttons 2a are arranged in the vicinity of user's thumb, so that the user can specify the buttons 2a while grasping the portable computer 1. The buttons 2a may be displayed or may not be displayed in a predetermined mode.

Fig. 2 shows functional blocks realized by internal circuits and the touch panel 2 of the portable computer 1. The functional blocks realized by the portable computer 1 are a touch panel driver 3, a display driver 4, a graphical user interface (GUI) handler 5, an application 6, and the like. Moreover, the touch panel 2 includes a liquid crystal display unit 7 and a resistance film unit 8. It should be noted that components not related to the present invention will not be explained. Moreover, hardware (CPU, recording apparatus, and the like) constituting the aforementioned functional blocks are identical as an ordinary portable terminal and its explanation is omitted.

The application 6 includes a database application for managing an individual information, a mail application, a browser, an image creation application, and the like. The application 6 can be selected through a menu and some of the application 6 such

as the mail application may be selected by a push button (mechanical component). The application 6 creates a message related to display and supplies the message to the GUI handler 5. Upon reception of this message, the GUI handler 5 creates a display image information and transfers it to the display driver 4. The display driver 4, according to the display data, drives the liquid crystal display unit 7 to display information for the user.

When the resistance film unit 8 is pressed by a pen or a finger, output voltages associated with a coordinate X and coordinate Y are changed and these output voltages are transmitted as X coordinate data and Y coordinate data to the touch panel driver 3. The touch panel driver 3, according to the outputs from the resistance film unit 8, generates an event including information such as a touch panel depression, depression release, finger position, and the like and supplies the event to the GUI handler 5. The GUI handler 5, according to the event, generates a message corresponding to the GUI and supplies it to the application 6.

Fig. 3 shows a configuration example associated with the specified position detection of the touch panel driver 3. In this figure, the touch panel driver 3 includes a two-point specification detector 31, an inhibit circuit 32, and a two-point position calculator 33. The two-point specification detector 31 detects that two points are specified and its specific method will be explained later with reference to Fig. 13 and Fig. 14. Specified coordinate data (X, Y) is entered from an input block 30. When only one point is specified on the touch panel 2, a coordinate data (X, Y) from the

touch panel 2 is output as a detected coordinate data (X_1, Y_1). When two points are specified on the touch panel 2, coordinates of an intermediate point between them are output as coordinate data (X, Y). When the two-point specification detector 31 decides that two points are specified, the two-point specification detector 31 drives the inhibit circuit 32 so as to inhibit output of the input data as it is. Moreover, upon detection of that two points are specified, the two-point specification detector 31 uses the input data latched in the preceding value timing (coordinate data (X_1, Y_1) when one point is specified) and a current input data (X, Y) so as to calculate new specification position coordinates (X_2, Y_2) by extrapolation and outputs the coordinates data of two points (X_1, Y_1) and (X_2, Y_2). When the two-point specification detector 31 detects that the two point specification is released, the two-point specification detector 31 disables the inhibit circuit 32 so as to output an input data as it is.

Thus, an even can be generated when a single point is specified and when two points are specified.

Fig. 4 explains a configuration of a processing mode modification block 50. The processing mode modification block 50 is arranged, for example, in the GUI handler 5. In Fig. 4, the processing mode modification block 50 receives a control data input (event) and an operation data input (event). In the example of Fig. 4, the control data supplied indicates whether a single point has been specified or two points have been specified. Different mode processes are performed depending on whether the control data indicates a single point specification or two-point specification. For

example, in the case of the graphic process application, when the control data indicates a single point specification, the operation data is interpreted as a command to move an object to be operated and the corresponding move message is supplied to the application 6. On the other hand, when the control data indicates two-point specification, the operation data is interpreted as a command to rotate an object to be operated and a rotation message is supplied to the application 6.

Fig. 5 shows an operation example to process an graphic object using such a processing mode modification block 50. It should be noted that in this example, it is assumed that the graphic processing application is executed. In Fig. 5A, at an initial stage, it is assumed that a rectangular object is displayed. This can be created by the application 6 or selected through a menu. Next, this rectangular object is touched (pressed) by a finger, as shown in Fig. 5B and when the finger is moved while pressing the rectangular object, the rectangular object is also moved, as shown in Fig. 5C. Next, the rectangular object is pressed at two points, as shown in Fig. 5D. When one of the finger is rotated around the other while pressing the rectangular object, the rectangular object is rotated, as shown in Figs. 5E and 5F.

Fig. 6 explains operation of a control block for executing the operation of Fig. 5. The control block executing this process includes the GUI handler 5 and the application 6. In Fig. 6, no operation is performed in state S1. Next, a first finger touches the panel and a graphic object moves according to the finger position in state S2. In state S2, if the first finger is released, the state S1 is again set in. Moreover, in

state S2, if a second finger touches the panel, state S4 is set in so that the position of the first finger is stored as point A (S3) and the second finger can rotate the graphic object around the point A. In state S4, if one of the fingers is released and the remaining single finger is in the touch state, state is returned to S2 so that the graphic object is moved.

As has been described above, the processing mode can be switched between the move mode and the rotation mode depending on whether a single point or two points are pressed on the touch panel 2. Thus, a graphic object can easily be operated. It should be noted that the mode can be switched by specifying three positions.

Next, explanation will be given on a modified example of the aforementioned embodiment. Fig. 7 explains the processing mode modification block 50 in the modified example. In this figure, as a control data, a data (event) indicating whether a predetermined button is pressed is entered. The buttons 2a are arranged in a straight line as shown in Fig. 8 so as to be in the vicinity of the thumb of the user. Each of the buttons can be specified by slightly moving the thumb. When the control data indicates a predetermined button, the operation data is processed in the corresponding mode.

Fig. 8 shows an operation example using the processing mode modification block 50 of Fig. 7. In this example also, it is assumed that the graphic processing application is executed. When no buttons 2a are specified, as shown in Fig. 8A, it is possible to specify and move a graphic object, as shown in Figs 8B and 8C. In this

example, a heart-shaped object is moved to the lower left direction. Next, when the second button 2a from the top (enlarge/reduce button) is pressed, as shown in Fig. 8D, the enlarge/reduce mode is selected and so that the graphic object can be enlarged or reduced by specifying with a pen or finger. In this example, the pressing position is moved upward so as to enlarge the graphic object, as shown in Figs 8E and 8F. On the other hand, when the pressing position is moved downward, reduction is performed. Processes other than enlarge/reduce can also be performed by pressing a corresponding button. The buttons arranged at the left side of the touch panel in this example but they may be arranged at the right side. It is also possible to configure the apparatus so that the arrangement of the buttons can be switched. In such a case, the portable computer 1 may be grasped by the user's right hand or left hand.

Fig. 9 is a flowchart explaining the process of Fig. 8. Initially, at state S11, nothing is performed. Next, when an area other than the enlarge/reduce button is pressed (S12),control is passed to state S13 where an object is moved together with the position of a pen. When the enlarge/reduce button is pressed (S12), control is passed to state S14 to wait for a second pen (or finger) tough in the enlarge/reduce mode. If a second pen (finger) touch is performed in state S14, control is passed to state S15 where enlarge/reduce is performed in accordance with the pen position. Moreover, if the touch is released in step S13 and S14, control is returned to state S11 where nothing is performed. When the touch of the enlarge/reduce button is released in state S15, control is passed to state S13 where the object is moved. Moreover, if the other

touch than the touch of the enlarge/reduce button is released in state S15, control is returned to state S14 to wait for a touch specifying enlargement or reduction.

It should be noted that while explanation has been given on the enlarge/reduce button in Fig. 9, the other button functions are performed in the same way.

Next, explanation will be given on another modified example of the aforementioned embodiment.

Fig. 10 explains the processing mode modification block 50 of the modified example. In this figure also, a data indicated whether a button is pressed is entered as a control data (event). This data is also entered as an operation data and a corresponding menu is displayed. With the menu displayed, if a data is entered to operate an item selected in the menu, a predetermined processing is performed.

Fig. 11 shows a processing state in the modified example of Fig. 10. In this example, an application to select a processing according to a predetermined icon is executed. In Fig. 10A, buttons 2a are displayed in a vertical straight line at the left side of the touch panel 2 in the same way as the example of Fig. 8. If a graphic object is specified without specifying any of the buttons, the move processing is executed so that the object is moved together with the specification point, as shown in Figs 10B and 10C. Next, when a predetermined button 2a is pressed, a corresponding menu (a plurality of objects) is displayed, as shown in Figs 10D and 10E. Here, the other buttons disappear. When the remaining button and one of the icons (objects displayed) are simultaneously touched, a corresponding processing is performed, as

shown in Fig 10F. In this example, an icon group corresponding to the button 2a is displayed. It should be noted that in this example, two fingers of the right hand are used for operation but it is also possible to operate using the thumb of the left hand and one finger of the right hand or a pen. Moreover, the buttons 2a arranged at the left side of the touch panel 2 may also be arranged at the right side of the touch panel 2 instead. It is also possible to configure the apparatus so that the arrangement of buttons 2a can be switched between the right side and left side of the touch panel 2.

Fig. 12 is a flowchart explaining the control operation of Fig. 10. In Fig. 12, firstly, nothing is performed in state S21. In state S21, if a first touch specifies a graphic object without specifying any of the menu buttons 2a (S22), control is passed to state S23 where the graphic object is moved together with the movement of the pen. In state S21, if the first touch specifies the menu button 2a (S22), a corresponding menu pops up and control is passed to state S24 where the touch state is monitored. In state S24, if a second touch selects an icon, a selected command is executed (S25), the menu is pulled down, and control is passed to state S26 where the touch state is monitored. In state S26, when the touch of the menu button is released, control is passed to state S23 where the object is moved. In state S26, when the touch of the icon is released, control is returned to state S24 where the menu pops up. Moreover, in state S23 and state S24, when the other touch is also released, control is returned to state S21.

Next, explanation will be given on the two-point specification detection and the

coordinate data calculation in the aforementioned embodiment. Fig. 13 shows an operation of the two-point specification detection and the coordinate data calculation. It should be noted that symbols used have meanings shown in the figure. Moreover, Fig. 14 explains a scheme employed by the GUI: Fig. 14A shows that nothing is performed; Fig. 14B assumes that a first touch point A is moved; and Fig. 14C assumes that a second touch point B is moved. It is determined in advance whether to employ Fig. 14B or Fig. 14C. It is also possible to switch between Fig. 14B and Fig. 14C through a button operation according to whether the use is right-handed or the left-handed.

In Fig. 13, firstly nothing is performed in state S31. In state S31, if a first touch is performed, control is passed to a first touch coordinate calculation mode state S32. In state S32, a detected coordinate position N of the touch panel 2 is received, which is entered as the current first touch position coordinate A_n. In state S32, it is decided whether the touch is released or the touch point is moved at a predetermined time interval (S33). When the touch is released, control is returned to state S31. When the touch point is moved, it is determined whether the movement distance is within a threshold value (S34). If the movement distance exceeds the threshold value, it is determined that two points are touched and control is passed to a two-point touch coordinate position calculation mode state S35. That is, the previous first coordinate A_{n-1} is made the current first coordinate A_n, and the previous first coordinate value A_{n-1} is subtracted from the current coordinate data N multiplied by 2 so as to obtain a

current second coordinate value B_n. That is, $B_n = 2N - A_{n-1}$. If the movement distance is within the threshold value, it is determined that only one touch has been made previously and control is returned to state S32. Normally, when the specification position is moved continuously using a pen or finger, the movement distance per a unit time is not so great. In contrast to this, when a second touch is performed, the apparent coordinate position is changed in the stepped way up to the middle point. Accordingly, it is possible to detect such a sudden movement to identify a two-point specification.

Next, in state S35 (two-point mode), the movement is monitored to determine whether the movement distance is within the threshold value (S36, S37). If within the threshold value, the two-point mode is identified. As has been described above, it is determined in advance which of the touch points is moved for each GUI. As shown in Fig. 14B, if the first touch position is moved according to the GUI design (S38), the first touch position coordinate A_n is calculated by $A_n = 2N - B_{n-1}$ (S39) while the second touch position remains unchanged ($B_n = B_{n-1}$). On the contrary, as shown in Fig. 14C, when the GUI used is such that a second touch position is moved (S38), the touch position coordinates are calculated by $A_n = A_{n-1}$ and $B_n = 2N - A_{n-1}$ (S40). After the states S39 and S40, control is returned to state S36. If the movement distance exceeds the threshold value, it is determined that one of the touches is released and control is returned to state S32 (S37).

As has been described above, in this embodiment of the present invention, the

graphic processing can easily be performed with a small number of operations even when using a touch panel. Moreover, a user can use his/her thumb for input operation instead of grasping the portable computer. Moreover, even when two points are simultaneously touched, the user interface can be set so that one of the two points is fixed while the other point movement coordinate can easily be calculated. This significantly simplifies a command creation by a coordinate movement.

As has been described above, according to the present invention, it is possible to easily perform a graphic processing even when using a touch panel. Moreover, the thumb of the hand grasping the portable computer body can be used as input means. Moreover, even in the case of a pressure-sensitive (resistance film type) touch panel, it is possible to detect a movement of one of the two points touched, thereby enabling to create a command by two-point touch movement.

What is Claimed is:

1. A graphic processing apparatus comprising:

a touch panel;

means for deciding whether a single point or two points are specified on the touch panel;

means for performing a graphic processing in a first graphic processing mode when the single point is specified; and

means for performing a graphic processing in a second graphic processing mode when the two points are specified.

2. The graphic processing apparatus as claimed in Claims 1, wherein the first graphic processing mode is a processing for moving a predetermined graphic object along a trace of the specification position.

3. The graphic processing apparatus as claimed in one of Claims 1 and 2, wherein the second graphic processing mode performs at least one of enlargement, reduction, and rotation.

4. A portable computer comprising:

a frame which can be grasped by a user's hand;

a touch panel formed on the upper surface of the frame;

detection means for detecting specification of a predetermined area on the touch panel in the vicinity of a region where a user's thumb is positioned when he/she grasps the portable computer;

selection means for selecting a graphic processing mode corresponding to the predetermined area while the predetermined area is specified according to a detection output of the detection means; and

execution means for executing a graphic processing in the graphic processing mode according to another point specification on the touch panel.

5. The portable computer as claimed in Claim 4, wherein the graphic processing mode performs at least one of enlargement, reduction, and rotation.

6. A portable computer comprising:

a frame which can be grasped by a user's hand;

a touch panel formed on the upper surface of the frame;

detection means for detecting specification of a predetermined area on the touch panel in the vicinity of a region where a user's thumb is positioned when he/she grasps the portable computer;

display means for displaying a plurality of selection items on the touch panel according to a detection output from the detection means while the predetermined area is specified; and

execution means for executing a processing corresponding to a selection item specified while the predetermined area is specified and the selection item is specified on the touch panel.

7. A portable computer comprising:

a frame which can be grasped by a user's hand;

a touch panel formed on the upper surface of the frame;

detection means for detecting specification of a predetermined area on the touch panel in the vicinity of a region where a user's thumb is positioned when he/she grasps the portable computer;

interpretation means for interpreting another point specification on the touch panel in a corresponding interpretation mode according to a detection output from the detection means while the predetermined area is specified; and

execution means for executing a predetermined processing according to a result of the interpretation.

8. A coordinate position input apparatus comprising:

a touch panel for outputting a coordinate data of a middle point when two points are simultaneously touched;

storage means for retaining coordinate position of the two points detected previously;

detection means for detecting a coordinate position of a current middle point; and

calculation means for calculating a coordinate of one of the two touch points assumed to be a moving point by subtracting a coordinate position of a previous fixed point from a current middle point coordinate multiplied by 2.

9. The coordinate input apparatus as claimed in Claim 8, wherein when a second point is touched while a first point is touched, the touch point of the second point is calculated according to a current middle point coordinate position and a previous first point touch position coordinate position.

Abstract

The present invention enables to easily perform a graphic processing even when a touch panel is used. When a resistance film unit is pressed with a pen or a finger, output voltages associated with the X coordinate and the Y coordinate position are changed and these output voltages are transmitted as the X coordinate data and the Y coordinate data to a touch panel driver. According to the output from the resistance film unit, the touch panel driver generates an event for supply to a GUI handler. The touch panel driver includes a two-point specification detector which detects two point specifications and causes to calculate coordinates of the two points. The GUI handler generates a message corresponding to the GUI according to the event and supplies the message to an application. The GUI handler includes a processing mode modification block which differently interprets the event when a single point is specified and when two points are specified, thereby modifying the graphic processing mode.

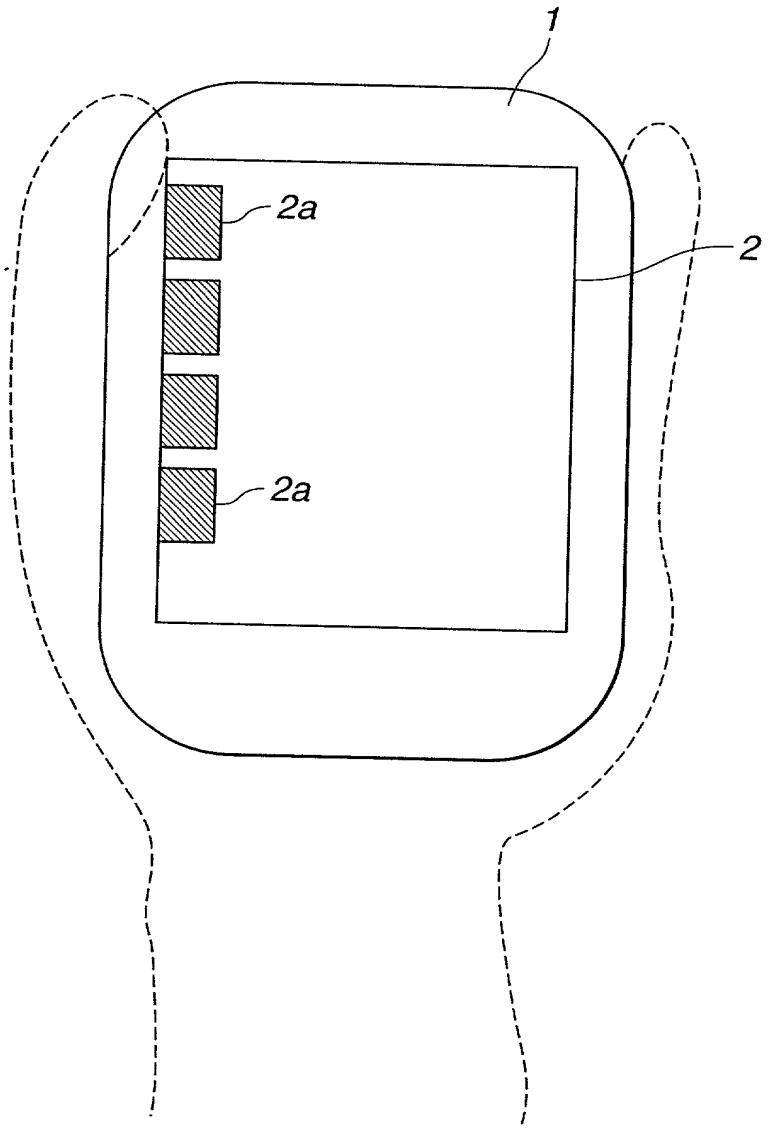

FIG.1

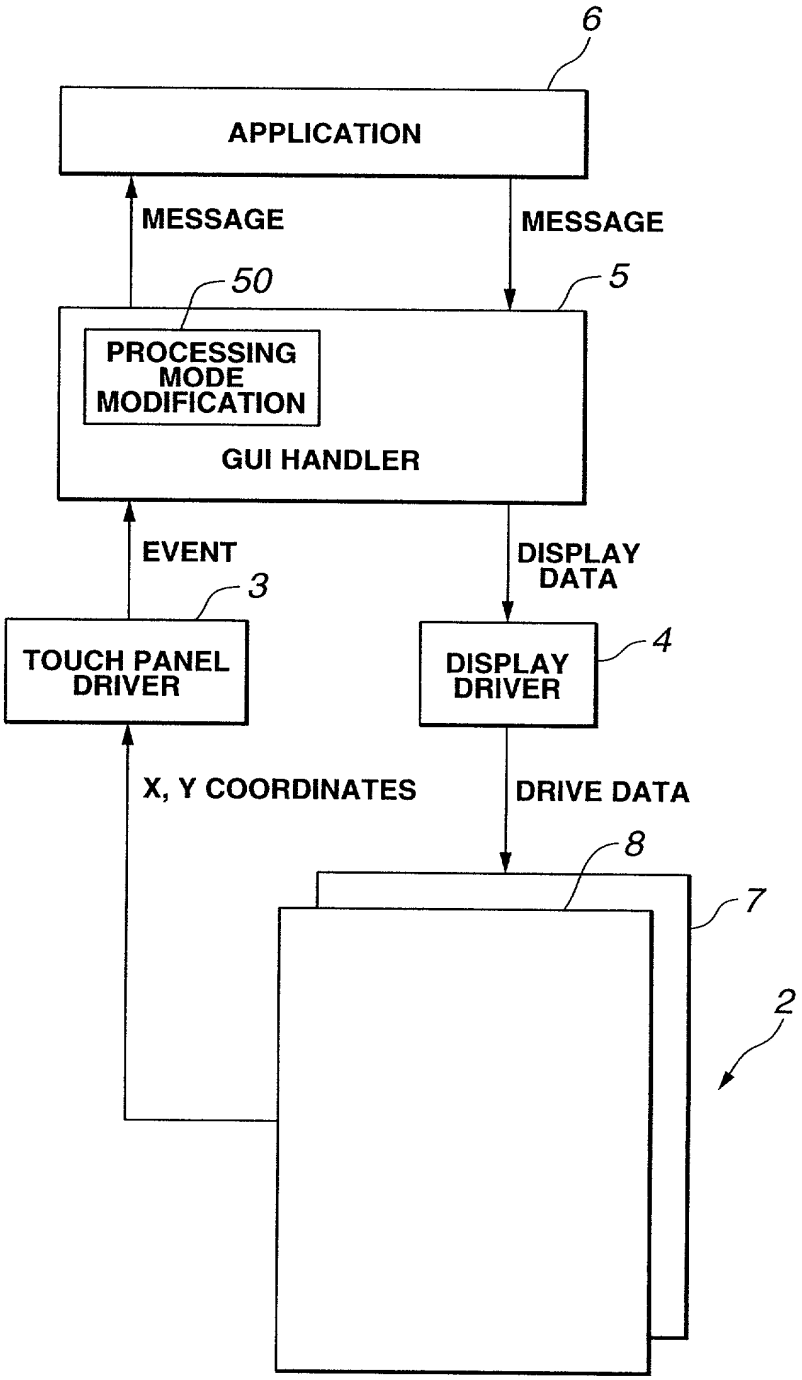
6
APPLICATION
MESSAGE
MESSAGE
50
5
PROCESSING MODE MODIFICATION
GUI HANDLER
EVENT
DISPLAY DATA
3
TOUCH PANEL DRIVER
DISPLAY DRIVER
4
X, Y COORDINATES
DRIVE DATA
8
7
2

FIG.2

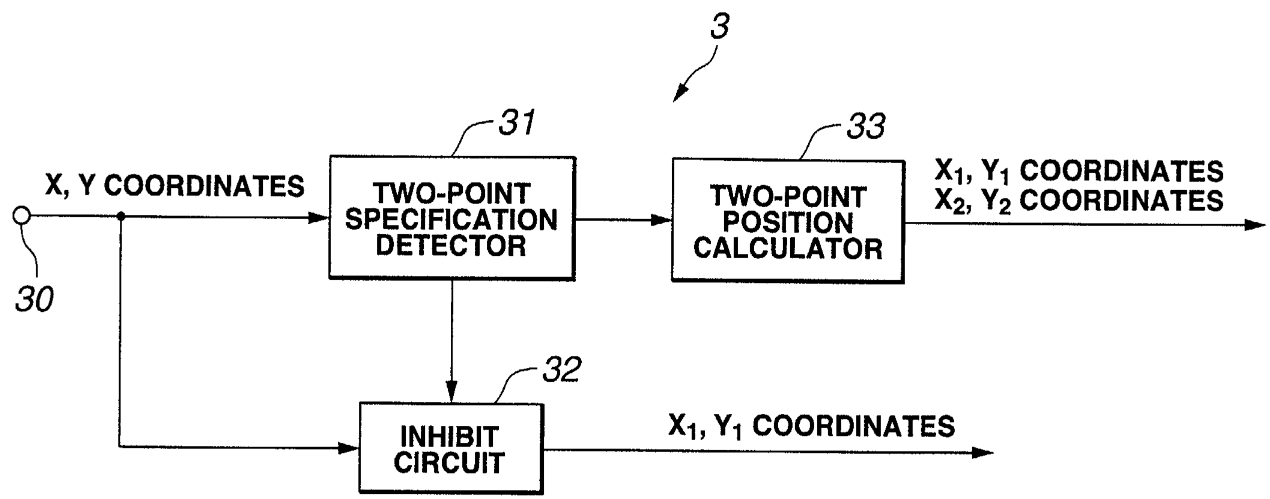

FIG.3

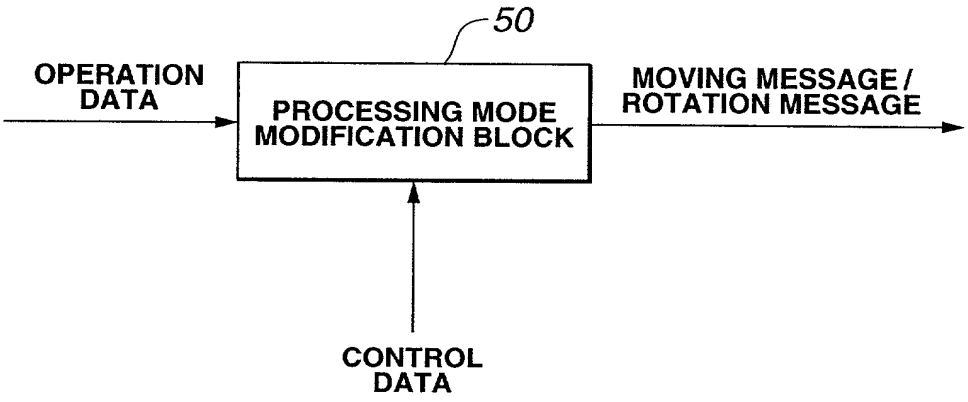
50
OPERATION DATA
PROCESSING MODE MODIFICATION BLOCK
MOVING MESSAGE / ROTATION MESSAGE
CONTROL DATA

FIG.4

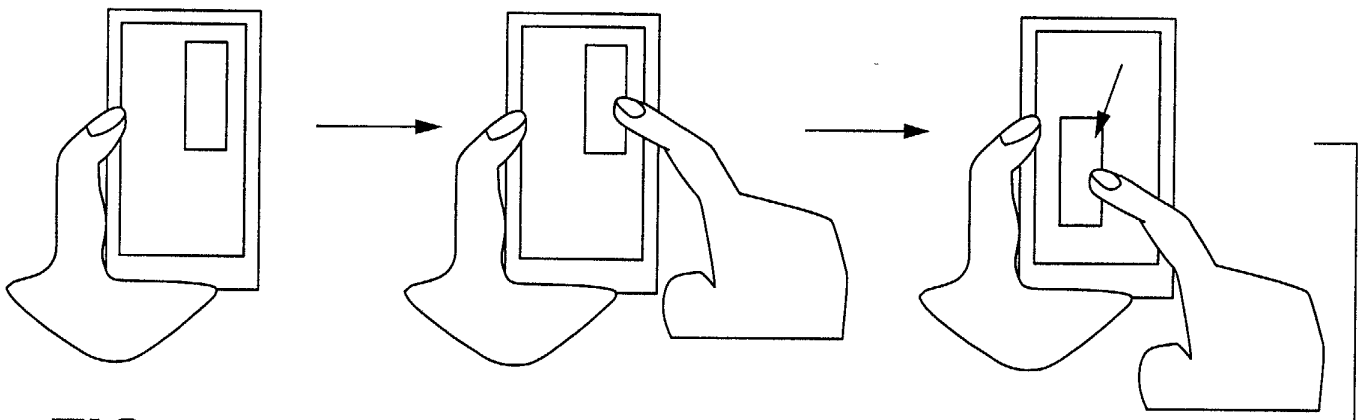

FIG.5A FIG.5B FIG.5C

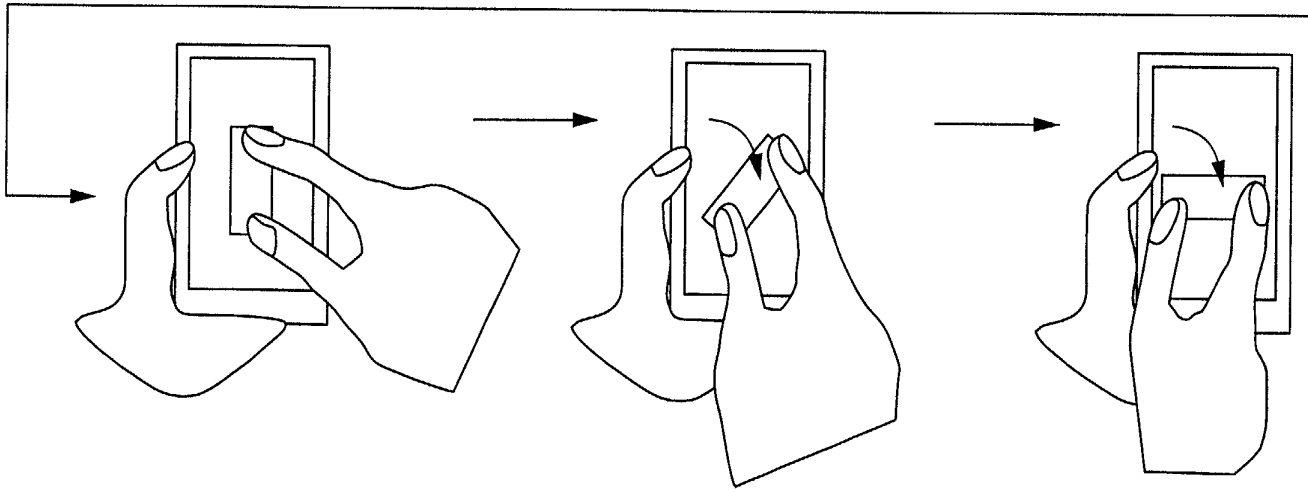

FIG.5D FIG.5E FIG.5F

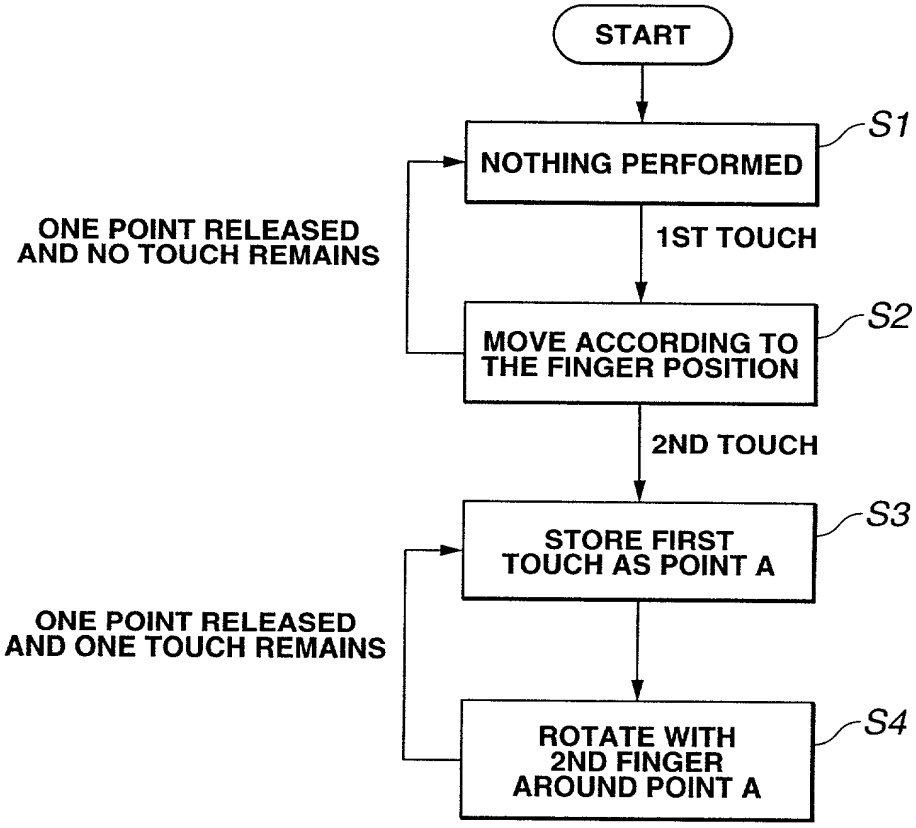
START
NOTHING PERFORMED
S1
ONE POINT RELEASED AND NO TOUCH REMAINS
1ST TOUCH
MOVE ACCORDING TO THE FINGER POSITION
S2
2ND TOUCH
STORE FIRST TOUCH AS POINT A
S3
ONE POINT RELEASED AND ONE TOUCH REMAINS
ROTATE WITH 2ND FINGER AROUND POINT A
S4

FIG.6

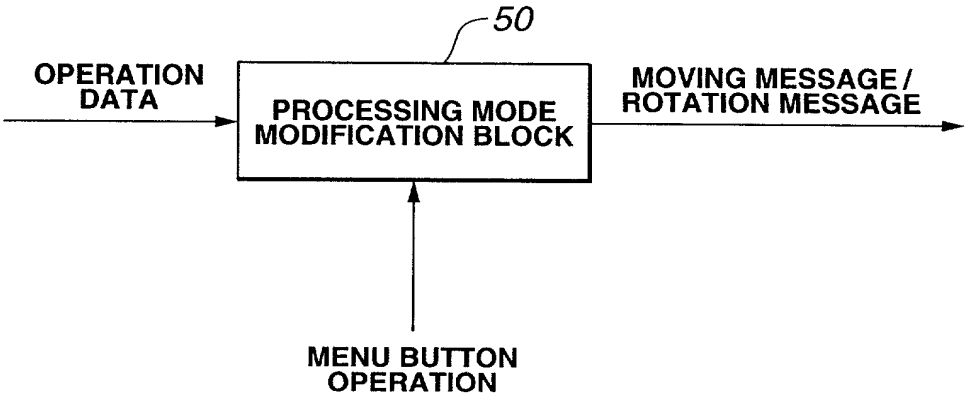
50
OPERATION DATA
PROCESSING MODE MODIFICATION BLOCK
MOVING MESSAGE / ROTATION MESSAGE
MENU BUTTON OPERATION

FIG.7

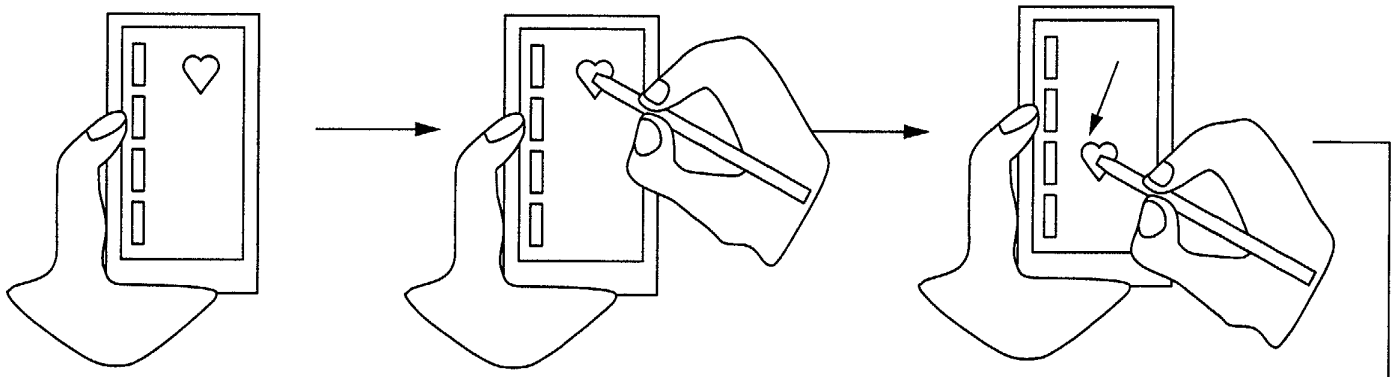

FIG.8A FIG.8B FIG.8C

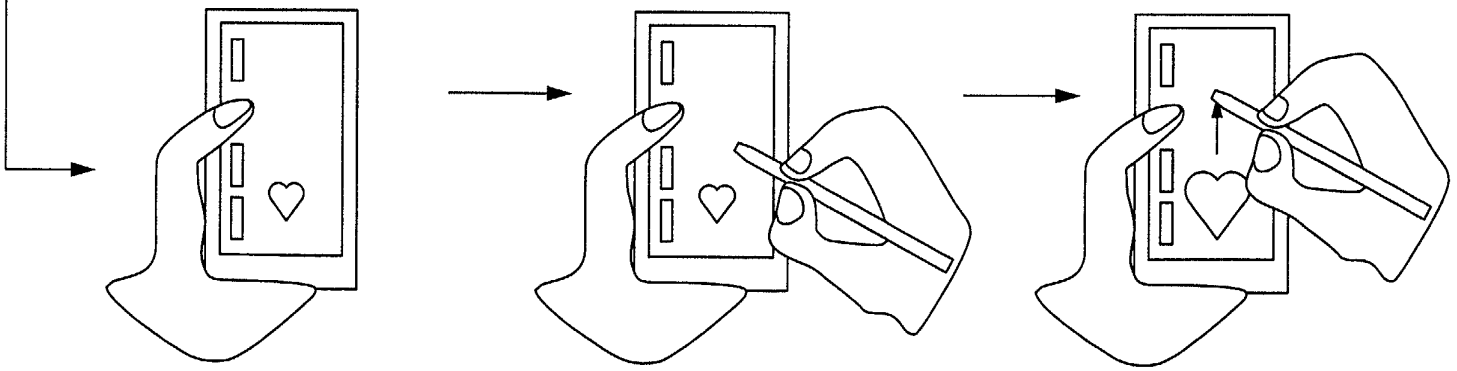

FIG.8D FIG.8E FIG.8F

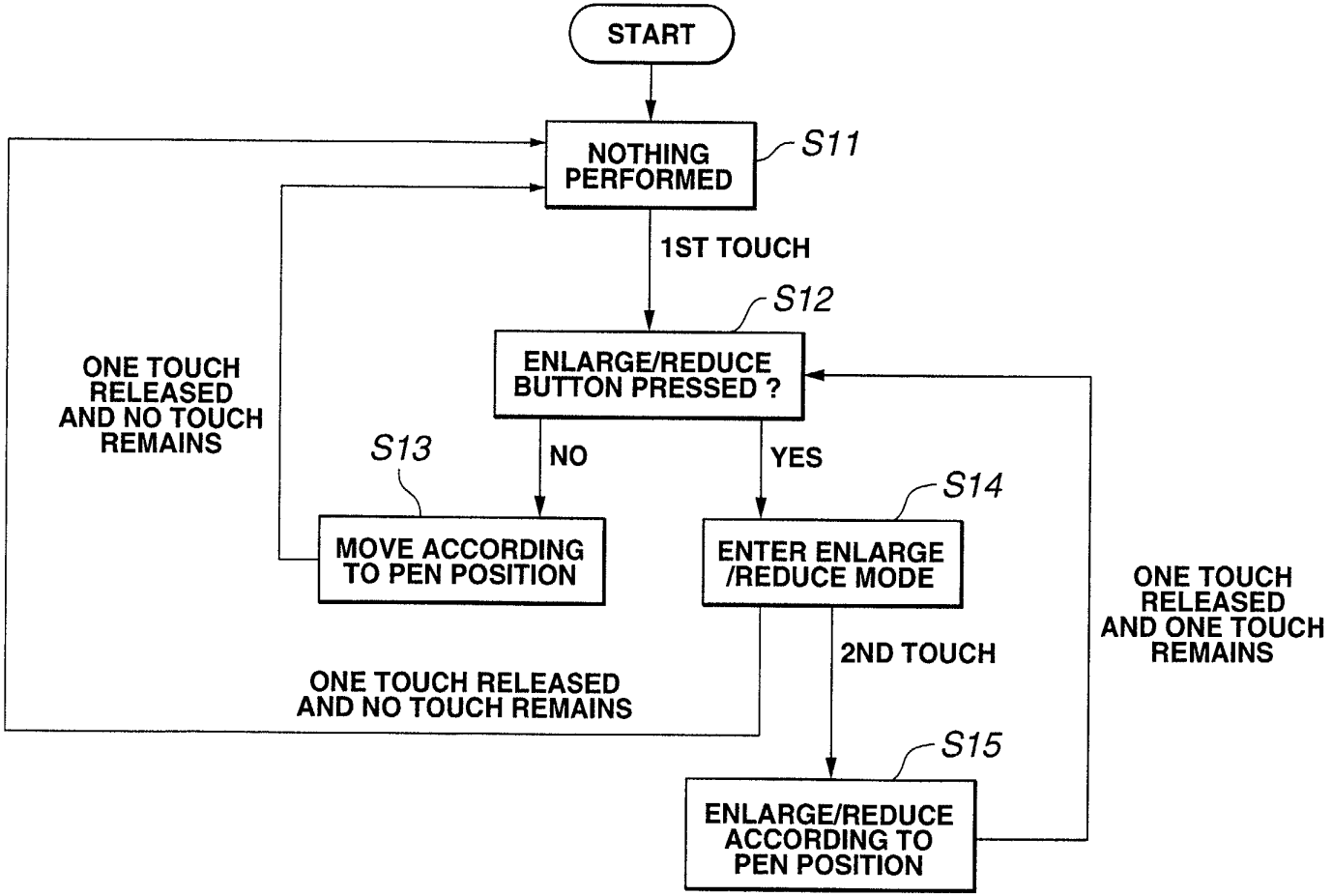
START
NOTHING PERFORMED
S11
1ST TOUCH
S12
ENLARGE/REDUCE BUTTON PRESSED ?
ONE TOUCH RELEASED AND NO TOUCH REMAINS
S13
NO
YES
S14
MOVE ACCORDING TO PEN POSITION
ENTER ENLARGE /REDUCE MODE
ONE TOUCH RELEASED AND ONE TOUCH REMAINS
2ND TOUCH
ONE TOUCH RELEASED AND NO TOUCH REMAINS
S15
ENLARGE/REDUCE ACCORDING TO PEN POSITION

FIG.9

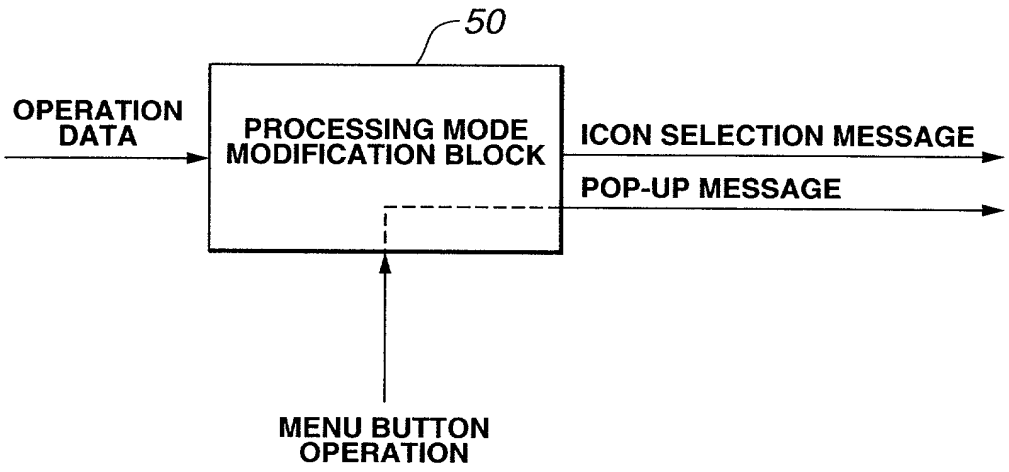
50
OPERATION DATA
PROCESSING MODE MODIFICATION BLOCK
ICON SELECTION MESSAGE
POP-UP MESSAGE
MENU BUTTON OPERATION

FIG.10

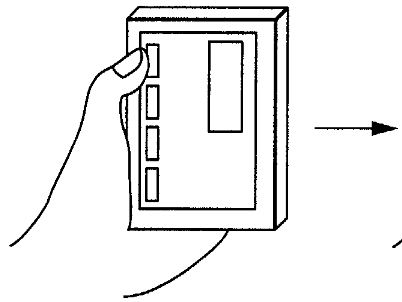

FIG.11A

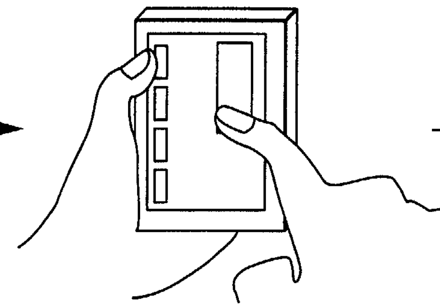

FIG.11B

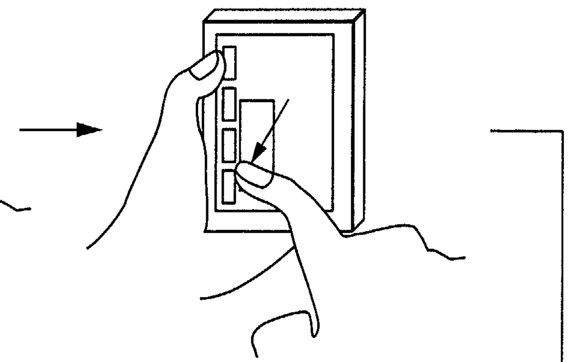

FIG.11C

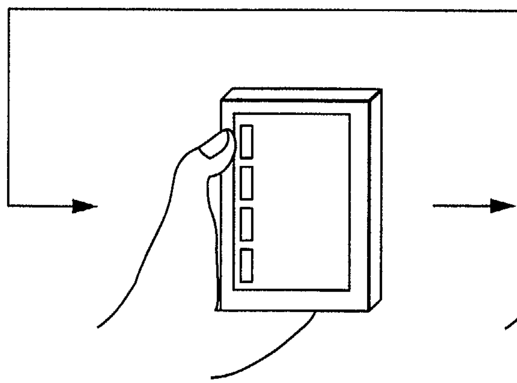

FIG.11D

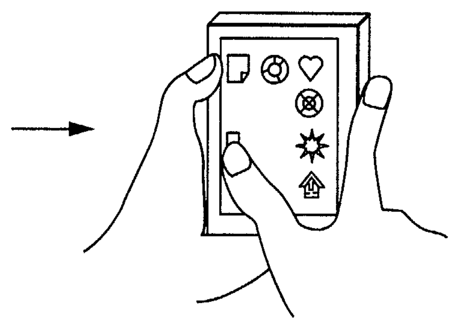

FIG.11E

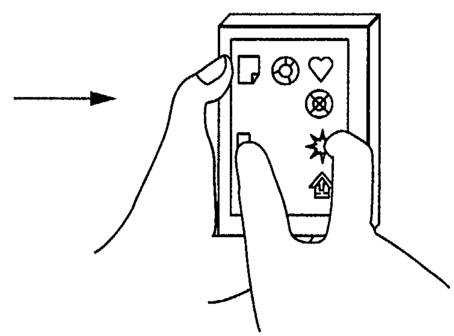

FIG.11F

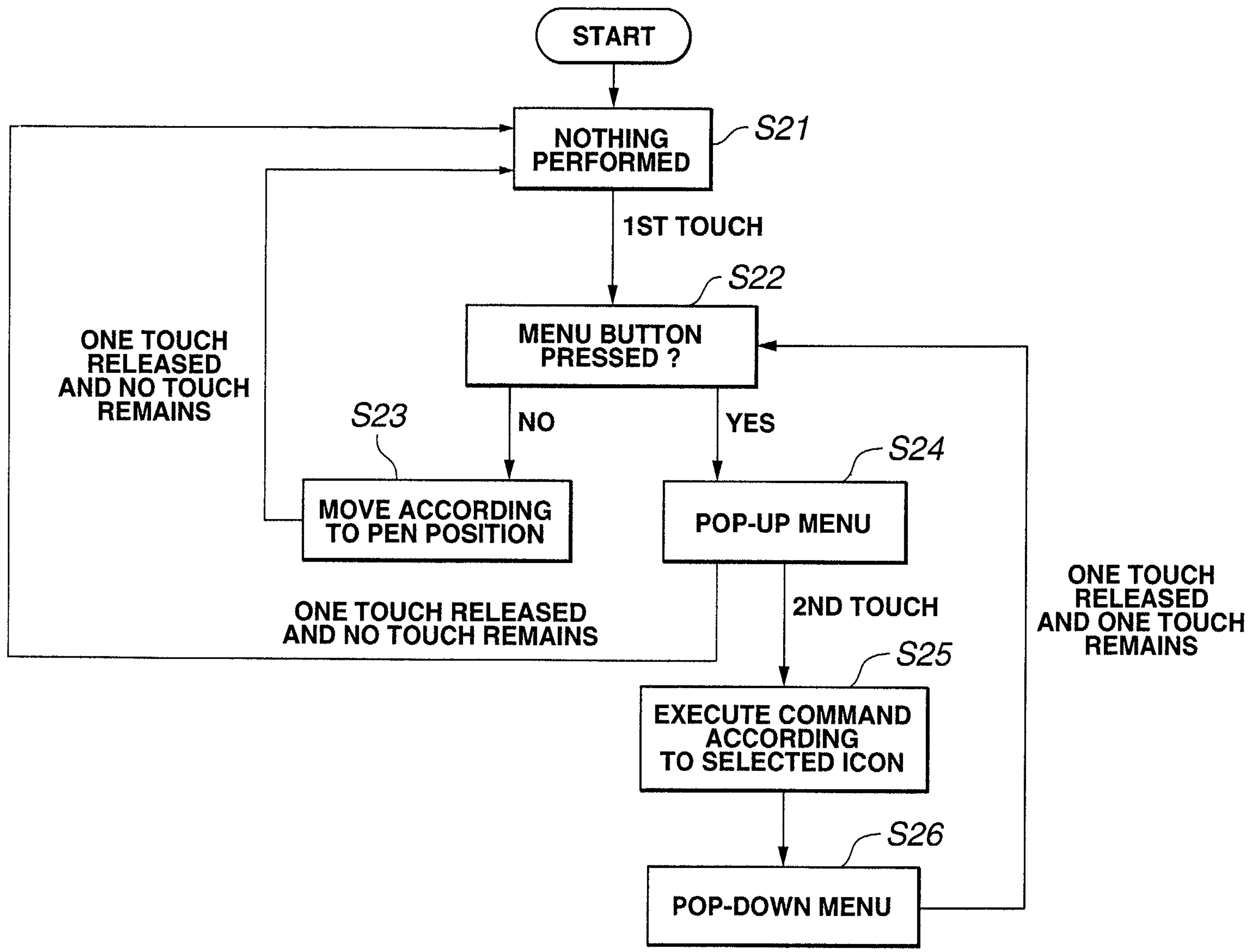
START
NOTHING PERFORMED
S21
1ST TOUCH
S22
MENU BUTTON PRESSED ?
NO
YES
S23
MOVE ACCORDING TO PEN POSITION
S24
POP-UP MENU
ONE TOUCH RELEASED AND NO TOUCH REMAINS
ONE TOUCH RELEASED AND NO TOUCH REMAINS
2ND TOUCH
S25
EXECUTE COMMAND ACCORDING TO SELECTED ICON
S26
POP-DOWN MENU
ONE TOUCH RELEASED AND ONE TOUCH REMAINS

FIG.12

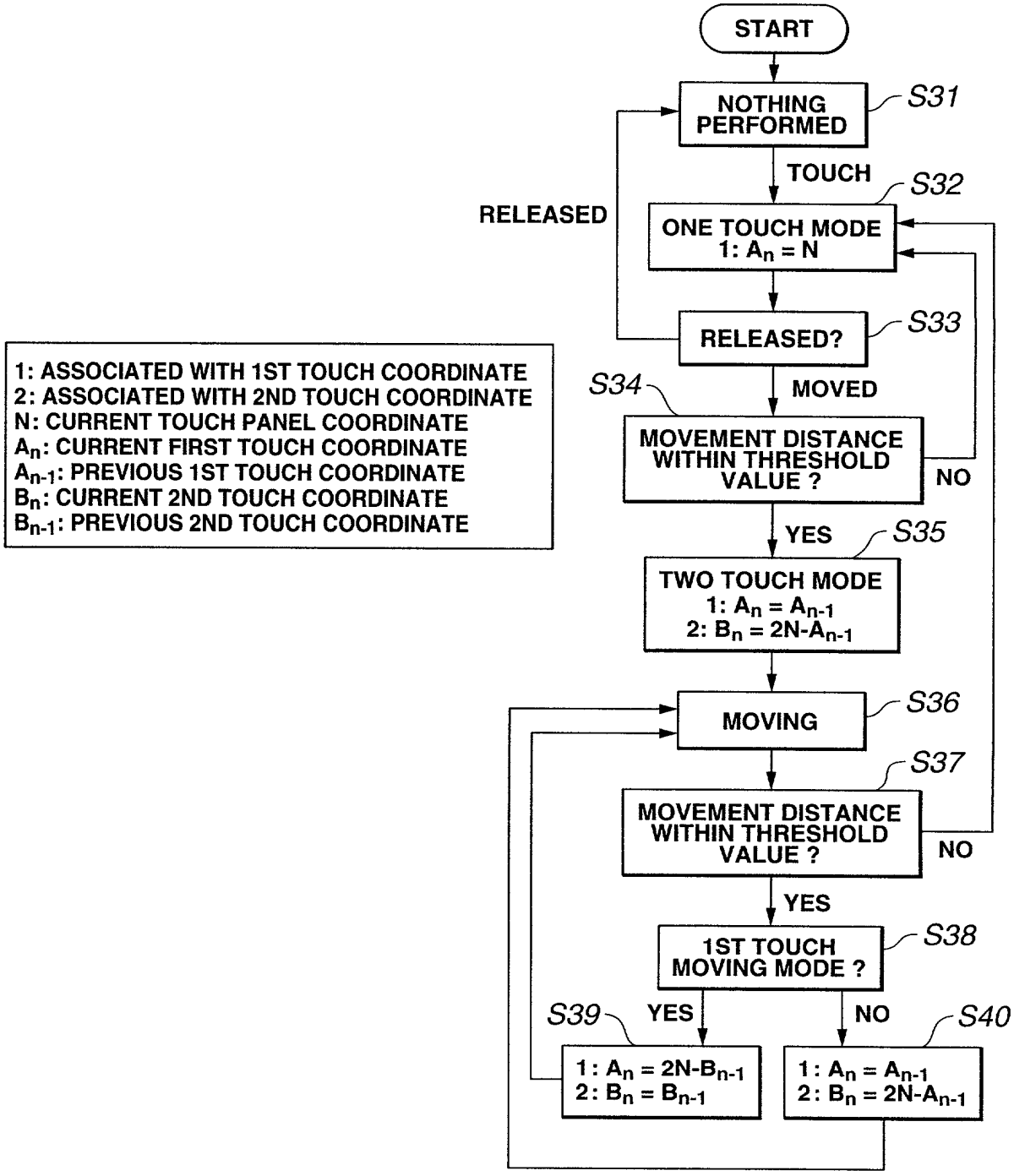
START
NOTHING PERFORMED
S31
TOUCH
S32
RELEASED
ONE TOUCH MODE
1: $A_n = N$
RELEASED?
S33
MOVED
S34
MOVEMENT DISTANCE WITHIN THRESHOLD VALUE ?
NO
YES
S35
TWO TOUCH MODE
1: $A_n = A_{n-1}$
2: $B_n = 2N-A_{n-1}$
MOVING
S36
S37
MOVEMENT DISTANCE WITHIN THRESHOLD VALUE ?
NO
YES
1ST TOUCH MOVING MODE ?
S38
S39
YES
NO
S40
1: $A_n = 2N-B_{n-1}$
2: $B_n = B_{n-1}$
1: $A_n = A_{n-1}$
2: $B_n = 2N-A_{n-1}$
1: ASSOCIATED WITH 1ST TOUCH COORDINATE
2: ASSOCIATED WITH 2ND TOUCH COORDINATE
N: CURRENT TOUCH PANEL COORDINATE
A_n: CURRENT FIRST TOUCH COORDINATE
A_{n-1}: PREVIOUS 1ST TOUCH COORDINATE
B_n: CURRENT 2ND TOUCH COORDINATE
B_{n-1}: PREVIOUS 2ND TOUCH COORDINATE

FIG.13

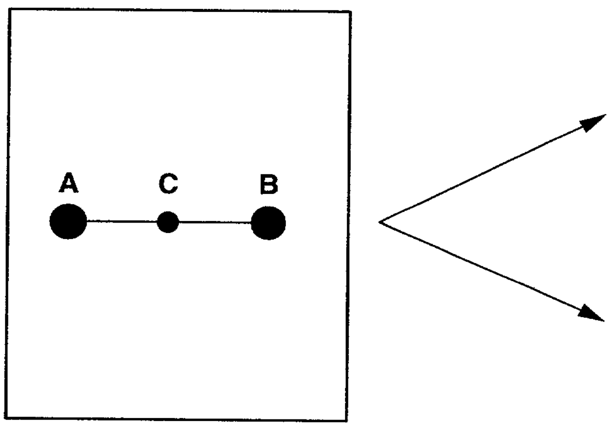

FIG.14A

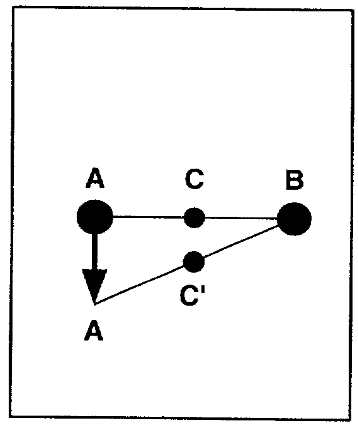

FIG.14B

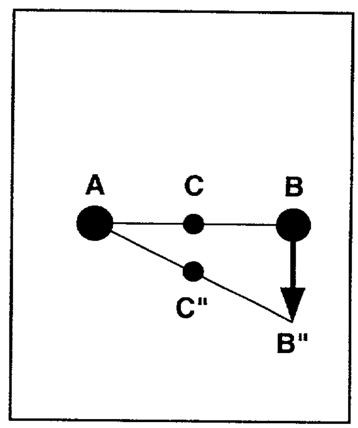

FIG.14C

Declaration and Power of Attorney For Patent Application
特許出願宣言書及び委任状

Japanese Language Declaration
日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。	As a below named inventor, I hereby declare that:
私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。	My residence, post office address and citizenship are as stated next to my name.
下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。 _____ _____	I believe I am the original, first and sole inventor (if only one named is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled. GRAPHIC PROCESSING APPARATUS
上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、 ☐ __月__日に提出され、米国出願番号または特許協定条約国際出願番号を_____とし、 （該当する場合）_____ に訂正されました。	the specification of which is attached hereto unless the following box is checked: ☐ was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).
私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。	I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.
私は、連邦規則法典第３７編第１条５６項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。	I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.
私は、米国法典第３５編１１９条(a)-(d)項又は３６５条(b)項に基き下記の、米国以外の国の少なくとも一ヵ国を指定している特許協力条約３６５(a)項に基ずく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。	I hereby claim foreign priority under Title 35, United States Code, Section 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.
Prior Foreign Application(s) 外国での先行出願 P11-313536 (Number) (番号)　Japan (Country) (国名)　4 November 1999 (Day/Month/Year Filed) (出願年月日)	Priority Not Claimed 優先権主張なし
私は、第３５編米国法典１１９条(e)項に基いて下記の米国特許出願規定に記載された権利をここに主張いたします。 _____ (Application No.) (出願番号)　_____ (Filing Date) (出願日)	I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below. _____ (Application No.) (出願番号)　_____ (Filing Date) (出願日)

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特許出願宣言書及び委任状

Japanese Language Declaration
日本語宣言書

私は、下記の米国法典第３５編１２０条に基いて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約３６５条(c)に基ずく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第３５編１１２条第１項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第３７編１条５６項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)

私は、私自身の知識に基ずいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じるところに基ずく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第１８編第１００１条に基ずき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may be jeopardize the validity of the application or any patent issued thereon.

委任状： 私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。（弁護士、または代理人の氏名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark office connected therewith (*list name and registration number*)

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Neil A. Smith	25,441	Mark C. Pickering	36,239	Eric N Hoover	37,355
Veronica C. Devitt	29,375	Patricia Coleman James	37,155	Frank J. Mycroft	46,946
Ronald L. Yin	27,607	Kathleen A Frost	37,326	Robert M. McConnell	46,912
Gerald T. Sekimura	30,103	Alan A. Limbach	39,749	J. Thomas McCarthy	22,420
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Michael J. Pollock	29,098	Kyla L. Harriel	41,815	Susan M. Schmitt	34,427
		* Recognition under 37 CFR 10.9(b)		Edward B. Weller	37,468

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国籍	Citizenship Japan
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国籍	Citizenship Japan
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第三共同発明者の署名	Full name of third joint inventor, if any JUNICHI REKIMOTO
第五共同発明者の署名　日付	Third inventor's signature　Date
住所	Residence Kanagawa, Japan
国籍	Citizenship Japan
私書箱	Post Office Address c/o SONY CORPORATION 7-35, Kitashinagawa 6-chome Shinagawa-ku, Tokyo, 141-0001 JAPAN